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Cognitive and emotional aspects in evaluating the flood risk

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Abstract

The local inhabitants of the Danube Delta live in constant fear of floods. Our objective is to reveal significant attitudes of locals with respect to this natural, probable risk. Number of participants: 143 inhabitants. Our objective is to reveal significant attitudes of locals with respect to this natural, probable risk. Content analysis and statistical procedures revealed concrete aspects of subjects' perceptions: cognitive contents, emotional aspects, behavioural anticipation, relationships between demographic variables and perceptions. There is need for risk management interventions: risk maps, communication between authorities and inhabitans, information, training for skills in flood events, education about natural risks.

Keywords: flood; risk; disaster; community; perception; subjective vulnerability;

1. Introduction

Risk is a characteristic feature of post-modern societies. Risk occurs as a topic in many debates on environmental policies (Garcia-Mira *et al.*, 2008). Studies on *risk perception* have been focused on many factors that lead to an evaluation of risk as follows: the factors related to the *happening* (the type of hazard, its dynamics) and factors related to *the individual perceiving it* (*the perceiver*, his personality and demographical aspects) (Bouyer *et al.*, 2001). When doing this analysis, we have taken into account three types of personality factors: anxiety, emotional patterns and one's *worldviews* (Freudenberg, 1996). At a subconscious level, inhabitants of risk areas perceive risk and tend to be prepared in advance in case of an eventual crisis. Psychological and behavioural models of the inhabitants of these areas comprise features concerning probable consequences of disasters on human life, property, family, neighbourhood,

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community etc. (Armaş, Avram, 2009). There is a series of cognitive scenarios connected with natural disasters, all centered around three main moments: pre-event perceptions, probable behaviour during the event and post-event behaviours. Subjective vulnerability encompasses both affective and cognitive sets, as well as actional ones. As a matter of fact, the cognitive sets comprise cognitive scenarios concerning the individual's behaviour regarding the probability of devastating events happening, as well as their probable consequences. The individual's confidence in authorities, the hope of social support and risk vulnerability are the most important aspects of the research on the relationship between man and disaster (especially those caused by floods) (Armaş, Avram, 2008).

Several social aspects are relevant to the study of flood-risk perceptions. Confidence is a mediator factor for the relationship between stability (be it legal, communitary, economic) and the inhabitants's feelings of safety (Fukuyama, 1998). Confidence, as a dimension of social capital, plays three key roles in the ongoing interaction between people and the community's institutions: *maintains the global social structure of the system*, stimulates the maintenance of honest and fair behaviours and maintains adaptability through one's eagerness to learn (Carnevale, 1995). Confidence is directly connected with *community involvement* (Putnam, 2000). In order to better understand risk-reactions, we need to analyse the augmentation process, based on the idea that certain events or dangers have an impact whose secondary effects overcome the immediate effect, by interacting with the psychological, social, institutional and cultural processes that either increase or reduce an individual perception of risk and can shape people's consequent behaviour (Renn *et al*, 1992).

2. Research

The Danube Delta is dominated by the risk of floods. Some areas are more prone to this risk, some less. From a human point of view, the inhabitants of these areas demonstrate a considerable level of psychological tension.

2.1. Objective and hypothesis

Our aim is to study psychological aspects of the perception of flood-risk in three areas of the Danube Delta. Apart from this we intend to reveal descriptive and differential data concerning the local inhabitants' perception on environmental risks. We started from the assumption that there are common perceptions to risk favouring factors, that risk evaluations differ from the point of view of confidence in authorities and psychological vulnerability, based on a series of demographical, socio-economical and psychological variables.

2.2. Sample

This research benefitted from the input of a number of *143 participants* (86 locals from Sf. Gheorghe/Tulcea County, 21 from the center of the city of Tulcea and 36 from the Tudor Vladimirescu village/Tulcea city -an area of higher risk), aged between 18-82 (A = 53.45, SD = 15.47). Of these participants, 75 are men (52.4%) and 68 women (47.6%), education years vary between 1 and 20.

2.3. Methodology

From a *methodological point of view*, we performed a series of interviews with the inhabitants of the risk-prone areas. The responses have been standardized into questionnaire items. Six of these items required open answers, while the rest of the items were built based on the Likert scale with 5 stages

(starting with stage 1 – very small and ending with stage 5 – very large). Items refer to several aspects of perception, social confidence, social support, and psychological and social vulnerability.

2.4. Results

In the *descriptive analyses*, qualitative data offered us the possibility to discover detailed aspects concerning the perception and experience of dangers caused by floods. In the following paragraphs we shall present various difficult events caused by natural factors. In the Tudor Vladimirescu village, 71.5% of the respondents felt that the most unfortunate natural disaster were the floods. In the city of Tulcea, 81.8% referred to the earthquake of 1997 as the most dangerous natural event they experienced. As far as the city is concerned, floods are not perceived as a threat, whereas in the town of Sf. Gheorghe, floods are perceived by a number of 43.3 % of the respondents as a real danger (most had in mind the floods of 1979 when answering the questions). Locals are highly preoccupied by the manner in which their lives and property could be endangered by floods: the effects of floods on their household (A=3,44, SD=1.25); effects on their health (A=3,46, SD=1.02); effects on mental balance (A=3,59, SD=1.05); effects on their family (A=3,64, SD=1.15).

Statistical data showed that the following have an average value in locals' attitudes and evaluations: blaming the authorities for the eventual disaster (A=3,02, SD=1.33); tendency to feel anxiety in crisis situations (A=3,12, SD=1.13); the perception of risk effects on everyday life (A=2,94, SD=1.37); the probable effects of floods on everyday life (A=3,26, SD=1.23); fear of floods (A=3,19, SD=1.21).

The items referring to aspects of training and support (often spoken of by using the phrase “to a small extent”) presented little value to our respondents: floods do not affect relationships with friends and acquaintances (A=2,01, SD=0.99); personal training to deal with a crisis is centred around the average in public opinion, since people feel they are not competent enough to intervene in case of floods (A=2,51, SD=0.85); people do not expect too much help from the others in case of flood (A=2,25, SD=0.77); the extent to which one can repair the damages (M=2,44, SD=0.74); the existence of personal back-up plans for emergency situations (A=1,88, SD=0.32).

For *differential analyses*, we have used the Kruska -Wallis test in order to study the differences in perception regarding the risk of floods among the respondents characterized by different demographical/psychological/social traits. With regard to the area they inhabit, Tudor Vladimirescu (TV) (22, 15.4% of the interviewees), Sf. Gheorghe (SG)(86, 60.1% of the interviewees) and the City of Tulcea (CT)(35, 24.5% of the interviewees), statistical data showed the following: the inhabitants of SG put less the blame on authorities for the effects of a disaster, as opposed to the inhabitants of TV (Chi-square (2)=43.31, $p<0.01$); household destruction is a type of damage the TV inhabitants' expect to experience more rather than those of CT(Chi-square (2)=30.93, $p<0.01$); flood risk affects more the day to day life in the case of TV inhabitants than in the case of CT inhabitants Chi-square (2)=30.93, $p<0.01$); floods are more likely to affect the health of the TV inhabitants (Chi-square (2)=6.92, $p<0.05$); ensuring family safety is more problematic for the inhabitants of TV and SG (Chi-square (2)=8.01, $p<0.05$); relationships with friends and acquaintances are more likely to be affected in TV and SG rather than in CT (Chi-square (2)=16.64, $p<0.01$); the inhabitants of TV show a greater fear of floods, whereas those in SG situate around the average and the ones in CT show almost no fear (Chi-square (2)=31.97, $p<0.01$); the inhabitants of TV and SG display greater skills in dealing with floods, if compared to the skills of the inhabitants of CT (Chi-square (2)=16.43, $p<0.01$); the inhabitants of SG expect to recover most of the damages, while the same expectation is severely reduced in the case of the TV inhabitants (Chi-square (2)=37.24, $p<0.01$); family support is perceived differently - the SG inhabitants expecting the most of it, followed by the inhabitants of TV and those of CT (Chi-square (2)=21.51, $p<0.01$); friends' support is expected to a larger extent in the case of SG inhabitants, and less expected in the case of TV inhabitants

(Chi-square (2)=24.93, p<0.01); TV inhabitants are ranked the first in having lower expectations from the government, followed closely by the ones of SG (Chi-square (2)=31.50, p<0.01); the inhabitants of TV expect less help from other organizations (Chi-square (2)=26.27, p<0.01).

As far as the expected support is concerned, the sample participants ranked the following types of support: financial (20,14%), work support (28,19.6%), moral (10,7%), material goods (37, 25.9%) and combinations of the above (also adding food and shelter) (35, 24.5%) (13, 9.1% did not respond to this item). Statistical results show us that: those expecting financial and material support are more likely to blame the authorities for an eventual disaster, compared to the others, with different expectations (Chi-square (4)=4.32, p<0.01); those expecting moral, work and mixed support feel that floods will have a negative impact on their relations with friends and acquaintances; those expecting material and financial support feel that social relations would not be affected to a large extent (Chi-square (4)=9.07, p<0.05); those expecting financial support anticipate that the number of persons eager to help will be a small one (Chi-square (4)=14.09, p<0.01); those who foresee the need of material support expect less help from their families (Chi-square (4)=25.17, p<0.01); those who expect moral support rely the most on their families(Chi-square (4)=25.17, p<0.01); those expecting to receive moral support, have higher expectations from local authorities (Chi-square (4)=21.36, p<0.01), those expecting work support have the least of expectations from local authorities; those who feel that they would be in need of material support have the highest expectations from the government (Chi-square (4)=11.55, p<0.05).

From the education point of view, the participants have been grouped according to their formal educational level. We investigated the manner in which the perception on the risk of floods is experienced in each of these categories(59, 41.3% - up to 4 years of education; 26, 18.2% - between 5 to 8 school years; 31, 21.7% - between 9 and 12 school years; 7, 4.9% between 13 and 16 years of education; 6, 4.2% - over 17 years of education; 14, 9.8% - did not inform us on their years of school education). Thus: the respondents with up to 4 years of studies exclude authority responsibility in the case of disasters (Chi-square (4)=24.21, p<0.01). Respondents with up to 12 years of school education foresee that floods are more likely to affect their households (Chi-square (4)=15.10, p<0.01); those respondents situated at the extremes – meaning those with up to 4 years of education and those with over 17 years of education) tend to reduce the strong impact floods have on everyday life (Chi-square (4)=16.56, p<0.01); those respondents with a higher degree of education do not feel that social relations might be affected by floods, whereas those respondents who have between 5 to 8 years of education say that floods will definitely affect social relations (Chi-square (4)=18.71, p<0.01); the most likely to act in crisis situations are those individuals from the category of 9 to 12 years of education (4)=9.96, p<0.05); those with up to 4 years of education expect more family support in case of a crisis, while those with more than 17 years of education have no family expectations (Chi-square (4)=11.53, p<0.01); those with a lower level of education tend to rely more on friends' support (Chi-square (4)=20.22, p<0.01); those respondents with up to 8 years of education might expect help from the local authorities, while those with 13 to 16 years of formal education expect this support less; those having more than 13 years of education tend to rely more on government support (Chi-square (4)=37.57, p<0.01); those who have 4 to 8 years of education expect less from other organizations (Chi-square (4)=34.03, p<0.01).

The family income has been approximated to the Euro rate of exchange. Those respondents with a monthly income of up to 200 Euros feel that an eventual crisis will affect more their household, compared to those families who earn more than 200 Euros/ month (Chi-square (5)=21.88, p<0.01). Moreover, the members of the former group believe that a probable crisis will definitely affect their social relations with friends and other acquaintances (Chi-square (4)=18.24, p<0.01). The respondents with lower family incomes have less expectations from local authorities (Chi-square (5)=14.63, p<0.05) and other organizations (Chi-square (4)=15.75, p<0.01).

From the point of view of professional activism, the sample participants have been divided between active and passive (retired and house wives). We used the U test and we established the fact that professionally passive participants, as opposed to active ones: ask for more responsibility from local authorities in case of a disaster (U= 1870.50, N1=81, N2=57, $p<0.05$ two-tailed); fear more the alteration of social relations in case of floods (U= 1214.00, N1=80, N2=56, $p<0.05$ two-tailed); feel more prepared to take rescue measures in case of floods (U= 1870.50, N1=81, N2=56, $p<0.01$ two-tailed); expect a higher number of people to offer support (U= 1798.50, N1=81, N2=55, $p<0.05$ two-tailed); expect more support from other organizations (U= 975.50, N1=60, N2=40, $p<0.05$ two-tailed). For the rest of the aspects – family, friends', acquaintances, local authority support – there are no differences between the two categories.

Compared to men, women display the following reactions with regard to floods: they believe to a larger extent that floods definitely affect the household (U= 2014.50, N1=68, N2=52, $p<0.05$ two-tailed); anticipate to a larger extent that floods will affect their psychological balance (U= 1912.00, N1=68, N2=52, $p<0.01$ two-tailed); foresee to a larger extent that floods will affect their relationships with friends (U= 2263.00, N1=68, N2=52, $p<0.01$ two-tailed); fear to a larger degree an eventual flood scenario (U= 1910.50, N1=68, N2=52, $p<0.05$ two-tailed); feel less prepared to intervene in case of flood (U= 1599.00, N1=68, N2=52, $p<0.01$ two-tailed).

3. Conclusion

This study revealed once more the importance of psychological intervention and disaster management, portrayed through the following practices: proper communication between citizens and authorities, updating action plans and crisis coordination, bringing up the debates, defining areas or risk moments which might help produce risk maps. Community training and simulations of critical events might lead to a local development and a significant improvement in friendships. Measures to prepare the locals against such disasters need to be enforced, so as to reduce fear. Another measure to be implemented in the near future pertains to the need to analyze community resources capable to compensate the needs of the poorest families as well as the construction of a social-help community fund.

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